

A Survey of Patient Access to Electronic Mail: Attitudes, Barriers, and Opportunities

Douglas B. Fridsma MD¹, Paul Ford MD², Russ Altman MD PhD¹

¹Section on Medical Informatics, Stanford University School of Medicine
MSOB X-2105, Stanford, CA 94305-5479

²Department of Medicine, Stanford University School of Medicine
900 Blake Wilbur Rd., Stanford, CA 94305-5430

fridsma@camis.stanford.edu, ford@camis.stanford.edu, altman@camis.stanford.edu

ABSTRACT

The use of electronic mail (e-mail) is increasing among both physicians and patients, although there is limited information in the literature about how patients might use e-mail to communicate with their physician. In our university-based internal medicine clinic, we have studied attitudes toward and access to e-mail among patients. A survey of 444 patients in our clinic showed that 46% of patients in the clinic use e-mail, and 89% of those with e-mail use it at work. Fifty-one percent would use e-mail all or most of the time to communicate with the clinic if it were available, and many of the communications that currently take place by phone could be replaced by e-mail. Barriers to e-mail use include privacy concerns among patients who use e-mail in the workplace, choosing the appropriate tasks for e-mail, and methods for efficiently triaging electronic messages in the clinic.

INTRODUCTION

The use of electronic methods of communicating medical information is increasing. Physicians already use electronic mail (e-mail) to consult with their colleagues [1, 2], to review and disseminate medical journals [3], and to obtain hospital laboratory information [4]. In Europe, the 3I Project represents a large collaborative effort to link general practitioners with pharmacies, hospitals, and consultants using standard electronic data interchange formats [5]. In most circumstances, however, these systems are designed to connect physicians with their peers or with physician-specific information resources, not to connect physicians to their patients.

Among patients, there is a similar growth in health-related electronic communication: bulletin boards and electronic forums for AIDS patients [6], caregivers of Alzheimer patients [7], and disabled patients [8] have been previously described. Although these computer bulletin boards provide a

variety of health-related information and database functions, the e-mail or communication features were the most popular and widely used by participants. These bulletin board systems were designed primarily for peer support among patients, and although some had the capability to ask questions of a medical expert, this expert was not the patient's personal physician.

Recently, a study by Neill [9] explored the use of patient-physician e-mail. In this survey study, Neill found that communication via e-mail was positively perceived by patients for many routine tasks, and 90% of patients who used e-mail to communicate with their physician used it to discuss a medical problem (N=10). It is likely that as the use of e-mail increases among patients, additional demands may be placed on physicians for this kind of access.

All physicians in our university-based internal medicine clinic have access to e-mail, and use it routinely to discuss patients and patient problems with other clinic physicians. Informally, we have noted an increase in the use of e-mail between a subset of computer-literate patients and their physicians. However, a large number of patients with e-mail access to their physician could become problematic if physicians are overwhelmed with messages and are ill-equipped to triage these messages effectively. Adoption of e-mail in this setting might be impaired.

An informal study conducted in 1993 (Ford, 1993 unpublished data) suggested that there may be a large number of patients willing to use this medium for communication: 54% of clinic patients surveyed indicated they would use e-mail to communicate with their physician if this option were made available. In anticipation of more widespread use of e-mail within our clinic, we completed an exploratory survey to examine potential strategies for the successful adoption of this new form of communication between physicians and patients.

METHODS

The university-based internal medicine clinic in which the study was performed has 70% of patients enrolled in managed-care plans, 25% with Medicare health insurance, and 5% of patients with Medicaid insurance. Although some medical house officers have their outpatient clinic in this setting, most patients are seen by full-time clinical faculty. A survey comprising 18 questions was distributed during a two-week period to all patients when they checked in for their scheduled appointments in the clinic. Questions were grouped into three main categories: (1) patient demographics and current health care use patterns, (2) current methods used by patients to communicate with the clinic, and (3) access and attitudes toward e-mail for communication with their physician. Patients completed the survey while waiting to see their physician, and all patients that had completed at least part of the survey were included in the study. Responses were coded into categorical observations for analysis. For ranking questions, the mean ranks were tabulated for each question. In all circumstances, calculations were based on the number of patients that completed a particular question.

RESULTS

Survey Response Rate

A total of 444 of 770 patients (58%) completed at least part of the questionnaire while they waited to see their physician. Since all patients did not answer or rank every question, the total number of responders varied for individual questions.

Demographics and Health Care Utilization

A total of 177 (41%) of the patients were men, 257 (59%) were women. The median age group was 40 to 50 years old for men and 30 to 40 for women. For more than half the patients (55%), this was the only university-based clinic in which they received care. Most patients (58%) visited the clinic every 6 months or less and talked with their physician or nurse with about the same frequency.

Current Mediums of Communication

Patients were asked to rank from 1 to 5 (1 signifying most common, and 5 least common) the principal mediums through which they communicated with the clinic. Not all patients ranked all categories; the number of patients that provided any rank for the question is listed in Table 1. Most patients used the telephone as their primary medium of communication, and of the 119 patients who ranked e-mail as a medium of communication, most ranked it last.

Table 1. How Patients Communicate with the Clinic

Medium of Communication	No. of Patients Ranking	Mean Rank
telephone	404	1.1
office visit	233	2.2
mail	150	3.9
fax	118	4.8
e-mail	119	5.0

Similarly, when the clinic staff wanted to communicate with patients, the telephone was the principal medium they used (Table 2). Only 17 patients indicated that they currently received information from the clinic staff via e-mail.

Table 2. How the Clinic Staff Communicates with Patients

Medium of Communication	No. of Patients Ranking	Mean Rank
telephone	310	1.2
office visit	162	1.7
mail	103	2.1
e-mail	17	4.1
fax	14	4.0

Each patient was asked what was the typical purpose of the communication when they contacted the clinic. These results are summarized in Table 3. Nearly all patients ranked scheduling a routine visit as the most common reason for contacting the clinic. Other reasons for contacting the clinic were specific to each patient, so no obvious ranking for all patients was obtained.

Table 3. Purpose of Patient Communication

Purpose of Communication	No. of Patients Ranking	Mean Rank
schedule routine visit	337	1.2
schedule urgent visit	246	2.8
medical advice	240	3.1
medication refill	215	4.2
obtain test results	194	4.4
HMO authorization	196	4.5
emergency visit	169	5.5

Electronic Mail Access and Attitudes

Of patients surveyed, 194 (46%) used e-mail. Of those, 43 patients (23%) used in-house e-mail systems that could only be used within their workplace. The remaining 151 (77%) had the ability to send messages to people outside their workplace or from home. Men and women had similar levels of e-mail access: Of patients with e-mail, 91 (46%) were men and 103 (54%) were women. Patients between 20 and 50 years of age constituted more than 83% of patients with e-mail, although patients as old as 80 used e-mail.

Table 4 shows patient e-mail use stratified by age with percentages within a stratification indicated by parentheses. None of the patients less than 20 years old used e-mail. Patients 20 to 30 years old used e-mail more frequently than any other group. Access to electronic mail decreased as age increased, although all age groups over 20 years of age had at least some patients that used e-mail.

Table 4. Patient E-mail Access by Age

Age	Responders	Use E-mail	Don't Use E-mail
<20	3	0	3
20-30	66	43 (65%)	23 (35%)
30-40	129	69 (53%)	60 (47%)
40-50	102	49 (48%)	53 (52%)
50-60	53	18 (34%)	35 (66%)
60-70	38	9 (24%)	29 (76%)
70-80	27	5 (19%)	22 (81%)
>80	5	1 (25%)	4 (75%)
Total	423	194 (46%)	229 (54%)

Most patients used e-mail primarily at work. Of all patients who used e-mail, 169 (89%) used it at work, 62 (33%) used it at home, and 46 (24%) used e-mail both at work and at home. A total of 95 (49%) patients that used e-mail indicated that even though e-mail was available to them, they would not use it for personal or family matters. In this subset of patients, only 11 used e-mail at home. The remaining 84 (88%) patients used e-mail primarily at work.

All patients, regardless of whether they currently used e-mail or not, were asked if they would use e-mail to communicate with the clinic if they had access to it (Table 5). Ninety-nine (51%) patients who currently use e-mail said they would use it all or most of the time; 48 (24%) patients without e-mail said they would use it to communicate with the clinic staff.

Table 5. Patient Estimated Frequency of E-mail Use

Estimated Frequency of Use	Responders	Currently Use E-mail	Currently Don't Use E-mail
all the time	60	41 (68%)	19 (32%)
most of the time	97	58 (60%)	39 (40%)
occasionally	110	58 (53%)	52 (47%)
rarely	50	18 (36%)	32 (63%)
never	62	13 (21%)	49 (79%)
Total	379	188 (50%)	191 (50%)

Finally, patients were asked what would prevent them from using e-mail to communicate with their physician. For those patients who used e-mail primarily at work, 48 patients (38%) would not use e-mail for reasons of privacy or convenience. Only 7 (10%) of the patients who used e-mail at home listed privacy as a barrier to the use of e-mail to communicate with their physician.

DISCUSSION

Despite our response rate of 58%, our study population is likely representative of our clinic population. Patients were given time to complete the questionnaire only between the time of check in and seeing their physician, and it is likely that those not completing the questionnaire were unable to do so because of time constraints, rather than selection bias. Despite the random error introduced by sampling, it is encouraging that this study confirms our findings in our previous study of 200 patients (Ford, 1993 unpublished data).

Our clinic population is composed primarily of patients in health maintenance organizations (HMOs) and is similar to other clinics in the San Francisco area, that have a significant HMO patient population. Our location in Silicon Valley is reflected in the high levels of e-mail sophistication among this population of patients, and this specialized population may serve as a test bed for research into computer-mediated patient-physician communication.

Work by Neill [9] indicates that patient-physician communication via e-mail is "positively perceived" by patients and that e-mail is suitable for simple and non urgent problems. In our study, there are two primary ways in which patients receive information from their physician: by telephone and through office visits. Other data collected in our clinic suggest that the purpose of more than 40% of telephone calls is the management of simple or non urgent problems that may be appropriately managed using e-mail.

Substituting e-mail for simple communication tasks is not without potential problems, however. In the computer-science literature, there is a noteworthy body of work on media richness and choosing the most appropriate medium for communication [10, 11]. This computer science literature suggests that fact retrieval tasks can be done with a medium such as e-mail, but tasks that require negotiation and uncertainty are best performed with telephone conversations or face-to-face meetings. In medicine, the distinction between these two types of tasks can be blurred. A test result that is either positive or negative may be classified as a simple fact retrieval task, but may require a great deal of explanation to an anxious patient. Scheduling of routine appointments and return of normal laboratory results may be appropriate uses for e-mail, further investigation of other medical tasks that are suitable for this medium is warranted.

E-mail has the potential to benefit both physicians and patients. Physician-initiated e-mail might be used to remind patients of routine health care screening that they might otherwise miss. In other circumstances, e-mail may allow patients to obtain needed information without an office visit. In a study at the Harvard Community Health Plan, patients with access to electronic medical information in their home tended to call the physician's office more frequently, but often these calls could be handled by nurses [12]. Electronic mail would be a natural extension of these information systems and could provide personalized answers to the questions that patients have.

There are some fundamental problems that we have identified as well. Most patients use e-mail at work and there are many issues surrounding ownership of the messages and privacy that are situation specific [13]. This controversy may limit patient enthusiasm for this medium for discussion of personal medical issues. In our study, those patients who used e-mail at home were less concerned with issues of privacy and convenience than those who used e-mail at work, but represented a small subset of all patients who used e-mail.

The expanded use of e-mail by patients may have a profound effect on clinic operation. If we analyze our data to determine an upper and lower bound of e-mail use by patients, we can determine a range of potential e-mail usage among patients. Assuming all non-responders do not use e-mail, we can calculate a lower bound for e-mail use among our population. A conservative upper bound can be calculated by extrapolation of our study results to the rest of our patient population. Using a lower bound analysis, at least 25% of clinic patients have access to e-mail and

of these patients, 51% would use e-mail all or most of the time to communicate with the clinic. In our clinic population of 20,000 patients, this would mean that at least 2,500 patients (and as many as 9,000) would use e-mail as their primary method of communication. Extrapolating from current phone usage, we estimate that 50 to 100 e-mail messages a day could be generated by this population. If methods for intelligent sorting, authenticating, and triaging of incoming messages are not employed, physicians and nurses could quickly become overwhelmed by the number of e-mail messages they receive. Further work in these areas is needed to anticipate the expansion of e-mail use.

Although our population may not be representative of the country as a whole, it may serve as a model for the future. The Internet, the prototype of the information superhighway, is growing exponentially, with new system connections occurring every 20 minutes [14]. As patients become more sophisticated users of e-mail, they may demand electronic access to their physician. If electronic communication is to be successfully introduced, additional information about the barriers and potential problems must be obtained. Access that is both private and secure is important, and an environment that allows an honest and candid interchange should be fostered. This may mean that the current access to e-mail that patients have at work may not be adequate unless there are mechanisms to assure confidentiality. Additional mechanisms for intelligent triage of messages will also become necessary to prevent overwhelming current clinic operations. Only then can we use this new technology to improve patient care.

Acknowledgments

This work was supported by grant LM-07033 from the National Library of Medicine. Computing services provided by the CAMIS resource, grant LM-05305. Russ Altman is supported by NIH LM-05652 and the Culpeper Foundation. Nora Sweeny provided editorial assistance.

References

- [1] Branger PJ, van der Wouden JC, Schudel BR, et al. Electronic communication between providers of primary and secondary care. *British Medical Journal* 1992, 305(6861):1068-1070.
- [2] Sands DZ, Safran C, Slack WV, Bleich HL. Use of electronic mail in a teaching hospital. In Safran, C. (ed.), *Proceedings of the Seventeenth Annual Symposium on Computer Applications in Medical Care* Washington, D.C.:McGraw-Hill, 1993:306-310.

- [3] Kassirer J. Journals in bits and bytes: electronic medical journals. *New England Journal of Medicine* 1992, 326:195-197.
- [4] Antti-Poika M, Korpela M. Computer-supported cooperation of health care staff: the Peijas-Rekola case. In Degaulet P. et.al (ed.), *MEDINFO 92. Proceedings of the Seventh World Congress on Medical Informatics*. Amsterdam, Netherlands: North-Holland, 1992:106-111.
- [5] Hasman A, Ament A, Arnou PC, Van Kesteren AC. Inter-institutional information exchange in healthcare. *International Journal of Biomedical Computing* 1992,31(1):5-16.
- [6] Gustafson DH, Bosworth K, Hawkins RP, Boberg EW, Bricker E. CHES: a computer-based system for providing information, referrals, decision support and social support to people facing medical and other health-related crises. In Frisse, ME. (ed.), *Proceedings of the Sixteenth Annual Symposium on Computer Applications in Medical Care* Baltimore, MD: McGraw-Hill, 1992:161-165.
- [7] Brennan PF. Computer networks promote caregiving collaboration: the ComputerLink Project. In Frisse, ME (ed.), *Proceedings of the Sixteenth Annual Symposium on Computer Applications in Medical Care* Baltimore, MD: McGraw-Hill, 1992:156-160.
- [8] Hassett M, Lowder C, Rutan D. Use of computer network bulletin board systems by disabled persons. In Frisse, ME (ed.), *Proceedings of the Sixteenth Annual Symposium on Computer Applications in Medical Care* Baltimore, MD: McGraw-Hill, 1992:151-155.
- [9] Neill RA, Mainous III AG, Clark JR, Hagen MD. The Utility of Electronic Mail as a Medium for Patient-Physician Communication. *Archives of Family Medicine* 1994, 3:268-271.
- [10] Kydd CT, Ferry DL. Electronic mail, social presence and information richness. In Milutinovic V, et. al. (ed.), *Proceedings of the Twenty-Fifth Hawaii International Conference on System Sciences* Los Alamitos, CA, USA: IEEE Comput. Soc. Press, 1991, 4: 380-391.
- [11] Zack MH. Electronic messaging and shared context in an ongoing work group. In Mudge TN et.al. (ed.), *Proceeding of the Twenty-Sixth Hawaii International Conference on System Sciences*. Los Alamitos, CA, USA: IEEE, 1993, 4:528-537.
- [12] Gareiss R. Electronic Triage. *American Medical News* 1994, 4/25/94:23-27.
- [13] Castagnoli C. Someone's been reading my E-mail! Privacy protection for electronic mail users in the US and the EC. *Tolley's Computer Law and Practice* 1993, 9(6):215-220.
- [14] Rutkowski AM. A Year in the Life of the Internet. *Internet Society News* 1994,2(4):9.